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PEDIATRIC PREHOSPITAL TREATMENT PROTOCOLS

Prepared by:

The Pediatric Prehospital Treatment Protocols Subcommittee

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PEDIATRIC PREHOSPITAL TREATMENT PROTOCOLS SUBCOMMITTEE

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PEDIATRIC PREHOSPITAL TREATMENT PROTOCOLS

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Introduction

Several key prehospital elements in local Emergency Medical Services systems greatly facilitate delivery of high quality field care to children: 1) prehospital providers appropriately educated in the assessment and treatment of acute pediatric illness and injury; 2) specialized ambulance equipment, supplies and medications for children; and 3) standardized pediatric-specific treatment protocols. Two other documents developed by the California EMS for Children (EMSC) Project, under the California EMS Authority, outline recommendations for paramedic education in pediatrics, and appropriate ambulance Basic Life Support and Advanced Life Support equipment and supplies. This document provides guidelines for field treatment.

Prehospital treatment protocols for adult patients are frequently used in EMS systems. Recently, pediatric-specific treatment protocols have become more common, as children's issues within EMS have been actively addressed countrywide. According to a recent survey conducted by the California EMSC Project over half of the EMS agencies in California, now have pediatric treatment protocols. Nonetheless, there remains considerable variability in specific recommendations for field therapy. These variations in local treatment protocols are based on differences in local paramedic scope of practice, differences in local resources, and differences in medical opinion about appropriateness and safety of various pediatric BLS and ALS interventions. This document is the first statewide project to apply current scientific understanding of assessment and treatment of pediatric emergencies to prehospital care and to standardize specific pediatric field treatment, through uniform BLS and ALS paramedic protocols.

The present guidelines represent the consensus opinion of the Prehospital Pediatric Treatment Protocol Subcommittee, formulated under the California EMSC project. The Emergency Medical Directors Association of California (EMDAC) has been the primary source of clinical and administrative expertise in the development of the protocols.

INTERPRETATION OF PROTOCOLS AND BASIC PRINCIPLES

The following treatment protocols address the most common illness and injury conditions of childhood. Among ambulance-transported children, the most frequent prehospital complaints are trauma, altered mental status (especially seizures), respiratory distress, and toxicologic emergencies. Cardiac arrest represents between 2-5% of all pediatric field calls.

This document defines "children" or "pediatric" patients as less than 18 years for medical conditions, and less than 14 years for trauma, although physically mature medical patients over 14 years may be treated in some instances as adults. Other terms include "newborns" (under 24 hours), "neonates" (under 28 days) and "infants" (under 12 months).

The treatment guidelines are presented as protocols, not algorithms, although algorithms may provide better clarity for certain field situations. The protocols are written for easy translation into algorithms where such a format is preferred by local EMS agencies.

Interpreting the protocols

1) BLS interventions are outlined in the upper left-hand box of each protocol. These interventions are appropriate for all levels of providers and all EMS systems.

2) ALS interventions are outlined in the lower boxes. Within the ALS boxes, the protocols are logically divided internally into one or more treatment pathways, based on key aspects of patient assessment.

3) Special Considerations for pediatric care are described in the box on the right side of the protocols. Special Considerations provide more detailed information about specific elements in the treatment protocols.

4) All drug doses are weight-based and given per kilogram. There are frequent errors in paramedic field weight estimations, and this method of drug dose calculation is therefore subject

to inaccuracies and possible undertreatment or overtreatment. *Length-based calculations for drug delivery are more accurate and may be preferable in children under age 5 years, when derived from a validated length-based resuscitation tool (e.g., the "First Five Minutes" or "Broselow" tape).* However, length-based drug dosing is not yet commonly used in prehospital settings. The Appendix provides a chart of estimated weights in kilograms for children according to age. The chart also lists age-adjusted vital signs and endotracheal tube sizes.

5) Fluid boluses should use a balanced crystalloid solution, usually normal saline or Ringer's Lactate.

6) Some critical patients (e.g. multiple system trauma) require rapid hospital transport with minimal on-line communication (notification only), and minimal field interventions (i.e., airway and breathing support on scene, with IV attempts en route). On the other hand, other patients with medical conditions (e.g., status epilepticus, cardiac arrest) may be appropriately managed in the field prior to ambulance transport.

7) Individual presentations may vary because of age-related changes in signs and symptoms, and because of the normal spectrum of acuity of illness and injury. These guidelines are not intended to address every permutation or rare situation, and are not intended to replace good clinical judgement.

8) ALS interventions in children should ordinarily be minimized, and applied only for appropriate indications. IVs must be used cautiously in children, after carefully weighing the benefits of vascular access against the pain, psychological distress and cost of the procedure.

9) Control of pain in children transported by ambulance is an appropriate and important concern. Intravenous morphine sulfate (MS) 0.1 mg/kg (0.05 mg/kg for < 6 months) is the preferred agent. Prehospital narcotic analgesia for children has never been studied for efficacy and safety. However, the Subcommittee recommends that MS be used IV in children with painful conditions (e.g. burns, distal fractures) when there is no reasonable possibility of hypovolemia or occult hemorrhage. MS shouldordinarily only be administered after on-line

radio communication with a base hospital.

10) The role of on-line medical direction and the timing of transport in pediatric field treatment is subject to local needs and resources and should be addressed in local policies, procedures and protocols relating to pediatric care. The Subcommittee recommends that two-way communication with the base hospital be considered for all children under 2 years of age and for children in whom there is uncertainty about the appropriateness of an ALS intervention.

11) The current protocols represent optimal treatment. The EMS Authority recognizes that some of the ALS skills recommended in these protocols are beyond the basic scope of practice required in Title 22, and are in the optional scope only. While these guidelines represent the current state-of-the-art for pediatric prehospital clinical practice, they should be reviewed on a yearly basis to assure the effectiveness and safety of the proposed approaches to care and to integrate new clinical knowledge.

12) The present protocols deal exclusively with treatment. Non-treatment pediatric-specific policies, procedures and protocols for prehospital care should also be established by local EMS agencies. Such non-treatment field protocols include, for example, policies on consent, death in the field, SIDS, child abuse, triage and transport. Non-treatment field policies should be carefully reviewed by local EMS agencies to assure timeliness, appropriateness, and linkage with treatment protocols.

13) Implementation of the pediatric protocols should be accompanied by regular off-line reviews of paramedic and Base Hospital performance, including patient outcomes. Collection and analysis of standardized data elements from prehospital and in-hospital settings are essential for optimal planning and management of pediatric emergency and critical care systems.

Pediatric Primary Survey [1]

Field Primary Survey	Special Considerations
1. Establish level of responsiveness 2. Evaluate airway and protective airway reflexes. [2] 3. Basic airway/spinal immobilization prn.[3][4] 4. Oxygen.[5] prn 5. Assist ventilation prn.[6][7] 6. Stop hemorrhage. Evaluate and support circulation.[8][9] 7. Do environmental assessment, including consideration of intentional injury. 8. Determine appropriate treatment protocol.	[1] Determine scene safety. [2] Identify signs of airway obstruction and respiratory distress, including: ! cyanosis ! intercostal retractions ! stridor ! absent breath sounds ! drooling ! bradycardia ! nasal flaring ! apnea or bradypnea ! choking ! tachypnea ! grunting [3] Open airway using suction, jaw thrust and chin lift (and/or head tilt if no suspected spinal trauma). Consider placement of oral pharyngeal airway if child unconscious. [4] If cervical spine trauma suspected, immobilize spine with cervical immobilization device and backboard. Infants and young children may require under-shoulder support to achieve neutral cervical spine position. [5] Use nasopharyngeal or oral pharyngeal airway, mask, or oxygen by blow-by, as tolerated, with child in position of comfort. [6] Use chest rise as indicator of adequate ventilation. If chest rise is inadequate, consider: ! repositioning the airway ! foreign body in airway ! inadequate bag volume, or activated pop-off valve [7] Rescue breathing includes two initial, slow breaths (1-1/2 sec) then rate of 20 breaths/min for infant or child. [8] Assess perfusion using: ! heart rate ! mental status ! skin signs ! quality of pulse ! capillary refill ! blood pressure [9] Compression rate is 120/minute for infant, 100/minute for infants and children with 5:1 compression: ventilation ratio. Depths are 1/2-1 inch for infant and 1-1 1/2 inch for child.
	PEDIATRIC FIELD PRIMARY SURVEY

Pediatric Cardiac Arrest

<table>
<tr><th colspan="3">Field Treatment</th><th>Special Considerations</th></tr>
<tr><td colspan="3">1. Field Primary Survey [1]
2. CPR</td><td rowspan="2">[1] Provide family psychosocial support if resuscitation is not indicated or not successful.

[2] Use pulse oximeter, if available.

[3] Intraosseous lines are the preferred method for rapid vascular access in cardiac arrest patients.

[4] If intraosseous or intravenous access cannot be immediately established, give drugs down the ET tube. Epinephrine 1:1000, 0.1 mg/kg = 0.1 ml/kg ET, diluted in 1-2 ml of NS is standard dose therapy.</td></tr>
<tr><td>ASYSTOLE</td><td>PULSELESS ELECTRICAL ACTIVITY (PEA)</td><td>VENTRICULAR FIBRILLATION OR PULSELESS VENTRICULAR TACHYCARDIA</td></tr>
</table>

3. Quick-look paddles and/or cardiac monitor 4. Advanced airway.[2] 5. Vascular access.[3] 6. Epinephrine 1:10,000 (standard dose therapy) 0.01 mg/kg = 0.1 ml/kg. Maximum dose = 1 mg or 10 ml IO, IV. [4] 7. Epinephrine, 1:1,000 (high dose for second and subsequent doses) 0.1-0.2 mg/kg=0.1-0.2 ml/kg IO, IV, or ET. Repeat q 3-5 min. Maximum dose = 15 mg or 15 ml.	3. Quick-look paddles and/or cardiac monitor 4. Advanced airway.[2] 5. Vascular access.[3] 6. Epinephrine 1:10,000 (standard dose therapy) 0.01 mg/kg = 0.1 ml/kg. Maximum dose = 1 mg or 10 ml IO, IV.[4] 7. Fluid bolus: 20 ml/kg. Reassess. Repeat prn. 8. Consider pneumothorax, profound hypovolemia, or pericardial tamponade. 9. Epinephrine, 1:1000 (high dose for second and subsequent doses) 0.1-0.2 mg/kg = 0.1 - 0.2 ml/kg IO, IV, ET. Repeat q 3-5 min. Maximum dose = 15 mg or 15 ml.	3. Quick-look paddles and/or cardiac monitor 4. Defibrillation, 2 joules/kg. Double dose (4 joules/kg) and repeat x 2, and prn for refractory Vfib or Vtach. 5. Advanced airway.[2] 6. Vascular access [3] 7. Epinephrine 1:10,000 (standard dose therapy) 0.01 mg/kg = 0.1 ml/kg. Maximum dose = 1 mg or 10 ml IO, IV.[4] 8. 1% lidocaine, 1mg/kg IV, IO, or 3 mg/kg ET. 9. Defibrillate, 4 joules/kg 30-60 sec after medication. 10. Epinephrine, 1:1000 (high dose for second and subsequent doses) 0.1-0.2 mg/kg = 0.1-0.2 ml/kg IO, IV, ET. Repeat q 3-5 min. Maximum dose = 15 mg or 15 ml. 11. 1% Lidocaine, 1 mg/kg q 3-5 min to 3 mg/kg. 12. Bretylium, 5 mg/kg first dose, 10 mg/kg second dose. 13. Defibrillate, 4 joules/kg.	

Neonatal Resuscitation

Field Treatment	Special Considerations
1. Position the airway. 2. Suction the mouth and nasopharynx. [1] 3. Dry and keep warm with thermal blanket or dry towel. Cover scalp with stocking cap. 4. Stimulate by drying vigorously including the head and back. 5. Clamp and cut the cord. 6. Evaluate respirations. 7. Assisted bag-valve-mask ventilation 40-60 breaths/minute with 100% oxygen for severe respiratory depression. Use blow by or mask with 100% oxygen for mild distress. 8. Check heart rate at umbilical cord stump.	[1] If thick meconium is present, or thin meconium with respiratory distress,perform deep ET suction, using appropriate suction adapter if available. [2] Perform chest compressions with both thumbs (with hands encircling the back), at the mid-sternum and intermammary line, at a depth of 1/2"-3/4". [3] Use appropriately-sized ET tubes and laryngoscope blades. (see chart)

HEART RATE			
≤ 60/min	**60-80/min**	**80-100/min and rising**	**> 100/min**
9. Continue assisted ventilation. 10. Begin chest compressions at 120/min.[2] 11. If no improvement after 30 seconds, perform endotracheal intubation.[1] [3] 12. If no improvement, establish vascular access and give epinephrine (1:10,000) 0.01 mg/kg (0.1 ml/kg) IV or IO, or 0.03 mg/kg (0.3 ml/kg)ET. Repeat q 3-5 min. prn. 13. Reassess heart rate and respirations enroute.	9. Continue assisted ventilation 10. If no improvement after 30 seconds of ventilation with 100% oxygen, begin chest compressions. 11. Reassess heart rate and respirations en route.	9. Give oxygen by mask or blow by. 10. Stimulate 11. Reassess heart rate and respirations after 15 to 30 seconds. If heart rate < 100 begin assisted BVM ventilation with 100% oxygen. 12. Reassess heart rate after 15 to 30 seconds.	9. Check skin color. If peripheral cyanosis, give oxygen by mask or blow by. 10. Reassess heart rate and respirations en route.

NEONATAL RESUSCITATION

Pediatric Respiratory Distress

<table>
<tr><th colspan="3">Field Treatment</th><th>Special Considerations</th></tr>
<tr><td colspan="3">1. Field Primary Survey.[1]
2. Position of comfort. Enlist help of child's caretaker, if distress is mild-moderate.</td><td rowspan="3">[1] If basic airway cannot be established, consider foreign body obstruction and proceed with appropriate airway clearance maneuvers,based on patient age.

[2] Use pulse oximeter, if available.

[3] Deliver undiluted albuterol continuously if respiratory distress is severe.

[4] If respiratory distress is mild, consider albuterol by metered dose inhaler and spacer device. Use mask and spacer in infants and young children.

[5] Avoid naloxone in newborns.</td></tr>
<tr><td>OTHER, NON-OBSTRUCTIVE AIRWAY OBSTRUCTIONCAUSES OF RESPIRATORY INSUFFICIENCY
Upper airway (STRIDOR)Lower Airway (WHEEZING)
AIRWAY
Upper airway (STRIDOR)</td><td>OBSTRUCTION

Lower Airway (WHEEZING)</td><td>OTHER, NON-OBSTRUCTIVE CAUSES OF RESPIRATORY INSUFFICIENCY</td></tr>
<tr><td>3. Advanced airway prn.[2]

4. Cardiac monitor prn.</td><td>3. Advanced airway prn.[2]

4. Cardiac monitor.

5. Inhaled albuterol (3 ml of premixed 0.083% albuterol, or 3 ml of solution of 2.5 mg or 0.5 ml of 0.5% albuterol mixed with 2.5 ml of NS) prn.[3][4]
6. Epinephrine (1:1000), 0.01 mg/kg (0.01 ml/kg) SQ,if child unable to cooperate with inhaled albuterol (maximum dose, =0.3 mg or 0.3 ml). May repeat once.</td><td>3. Advanced airway prn.[2]

4. Cardiac monitor.

5. Administer naloxone, 2 mg IV, IM, IO or ET, for non-neonatal respiratory depression.[5]</td></tr>
<tr><td colspan="4">PEDIATRIC RESPIRATORY DISTRESS</td></tr>
</table>

Pediatric Bradycardia

Field Treatment		Special Considerations
1. Field Primary Survey.[1] Assure adequate oxygenation and ventilation. 2. If signs of diminished perfusion, and heart rate < 80/min in an infant, consider CPR.[2] If signs of diminished perfusion and heart rate < 60/min in a child < 5 years, consider CPR.[2] 3. Shock position prn for diminished perfusion.		[1] Most bradycardia in children is due to hypoxia. Apply 100% oxygen by non-rebreather mask. [2] Special conditions may apply in the setting of severe hypothermia. [3] Use pulse oximeter, if available. [4] Intraosseous lines are the preferred method for rapid vascular access in infants if frank hypotension is present. [5] Epinephrine doses up to 0.2 mg/kg (1:1000) = 0.2 ml/kg may be necessary; repeat doses every 3-5 min.
NORMAL PERFUSION	**DIMINISHED PERFUSION OR RESPIRATORY DISTRESS**	
4. Cardiac monitor 5. Vascular access prn.	4. Cardiac monitor. 5. Advanced airway prn.[3] 6. Vascular access prn (may take place en route).[4] 7. Epinephrine (1:10,000) 0.01 mg/kg IV/IO = 0.1 ml/kg. Maximum initial dose = 1 mg.[5] or, Epinephrine (1:1000) 0.1 mg/kg ET = 0.1 ml/kg, if no IV or IO. 8. Atropine: 0.02 mg/kg IV/IO Minimum single dose = 0.1 mg Maximum single dose = 0.5 mg for child; 1 mg for age > 10 years. May repeat once.	
		PEDIATRIC BRADYCARDIA

Pediatric Tachycardia

<table>
<tr><th colspan="3">Field Treatment</th><th>Special Considerations</th></tr>
<tr><td colspan="3">1. Field Primary Survey
2. Shock position prn.
3. Cardiac monitor. [1]
4. Venous access prn.</td><td rowspan="4">[1]. Use pulse oximeter, if available. Apply 100% oxygen by non-rebreather mask.

[2]. For ages >2 yrs, SVT rates may be slower (e.g. 180-220/min).

[3]. Use standard size pediatric paddles for cardioversion, if available for children <10 kg. Place on the anterior chest in a sternal-apical location. If pediatric paddles are unavailable, use adult paddles, placed anterior-posterior on the chest wall with firm contact.

[4]. If available defibrillator will not dial down to appropriate energy level, use lowest possible energy level available on the defibrillator.

[5]. Vagal maneuver in infants and pre-school children is ice water to face. In older children, use Valsalva.

[6]. If child is responsive, if possible administer 0.1 mg/kg of diazepam IV slowly prior to electrical shock.

[7]. 3 mg/kg lidocaine, if administered endotracheally. May repeat q 5 minutes to 9 mg/kg maximum endotracheal dose.

[8]. Consider adenosine.</td></tr>
<tr><td colspan="2">Narrow Complex
<u>(QRS < .08 sec)</u>

SINUS TACHYCARDIA
rate < 220/min [2]

SVT
rate > 220/min [2]</td><td><u>Wide Complex
(QRS > 0.08 secs)</u>

VENTRICULAR TACHYCARDIA
rate > 150/min</td></tr>
<tr><td>5. Consider fluid bolus at 20 ml/kg IV. Reassess. Repeat prn.

6. Consider fever or occult injury.</td><td>5. If perfusion is diminished and child is poorly responsive, administer synchronized cardioversion, at 0.5 joule/kg. If no response, repeat at 1 joule/kg. then defibrillate at 2 joules/kg, repeat 4 joules/kg [3][4]

6. If child has diminished perfusion, but is responsive, administer adenosine, 0.1 mg/kg rapid IV, or IO. Max dose 6 mg. Repeat dose in 3 minutes at 0.2 mg/kg IV. Maximum dose 12 mg.

7. If child has normal perfusion, attempt vagal maneuvers.[5]</td><td>5. If perfusion is diminished and child is poorly responsive administer synchronized cardioversion, at 1 joule/kg [5] If no response, repeat at 2 joules/kg, then defibrillate at 2 joules/kg, repeat 4 joules/kg [3][4]

6. Advanced airway prn.

7. After electrical cardioversion in child with diminished perfusion, administer 1% lidocaine 1mg/kg. May repeat q 5 minutes to 3 mg/kg maximum. [7]

8. If lidocaine is unsuccessful, use bretylium, 5 mg/kg first dose, 10 mg/kg second dose.

9. If child has normal perfusion do not cardiovert. Administer 1% lidocaine 1 mg/kg IVP. May repeat q 5 minutes to 3 mg/kg maximum.[7][8]</td></tr>
<tr><td colspan="4">PEDIATRIC TACHYCARDIA</td></tr>
</table>

Pediatric Shock

Field Treatment	Special Considerations
1. Field Primary Survey. 2. Shock position. 3. If trauma with ongoing bleeding, stop external hemorrhage. 4. Advance airway prn. (1) 5. Cardiac monitor. 6. Vascular access 7. Obtain blood for rapid glucose test and follow ALOC protocol if < 60 mg%.[3]	[1] Use pulse oximeter, if available. Apply 100% oxygen by non-rebreather mask. [2] Mix dopamine solution as follows: 6 x wt (kg) = amount of dopamine in mgs to add to 100 cc of fluid. 1 ml/hr = 1 mg/kg/min. [3] Use < 40 mg% if newborn.

HYPOVOLEMIA	DISTRIBUTIVE	CARDIOGENIC
8. Fluid boluses: 20 ml/kg IV or IO. 9. If suspected history of volume loss and no improvement after initial fluid bolus, administer additional fluid boluses at 20 ml/kg prn, to 60 ml/kg maximum.	8. Fluid boluses: 20 ml/kg IV or IO. 9. If history of fever or suspected infection, give additional boluses of 20 ml/kg prn, to 60 ml/kg. 10. If suspected allergic reaction, follow protocol for Anaphylaxis. 11. Consider dopamine 5-20 ug/kg/minute, after 60 ml/kg bolus of fluids.	8. Consider rhythm disturbance. 9. Fluid bolus, 10 ml/kg IV or IO. 10. Consider dopamine, 5-20 mcg/kg/min after 10 ml/kg bolus of fluids. [2]
		PEDIATRIC SHOCK

Pediatric Allergic Reaction-Anaphylaxis

Field Treatment		Special Considerations
1. Field Primary Survey.[1] 2. Shock position prn for diminished perfusion. 3. Advanced airway prn.[2] 4. Cardiac monitor. 5. Vascular access prn.		[1] Simple hives do not require field treatment. [2] Use pulse oximetry, if available. [3] Albuterol by metered dose inhaler is also acceptable. [4] Under circumstances where itching is severe, consider diphenhydramine, 1 mg/kg IV or IM. Maximum dose = 50 mg. [5] If the child is intubated and only access is per ET tube, give epinephrine (1:1000) 0.1 mg/kg = 0.1 ml/kg endotracheally. [6] If no vascular access, or ET tube, give epinephrine SQ initially. (1:1000), 0.01 mg/kg = 0.01 ml/kg. Maximum single dose 0.3 mg = 0.3 ml.
MILD RESPIRATORY DISTRESS	**SEVERE RESPIRATORY DISTRESS OR DIMINISHED PERFUSION**	
6. Wheezing: If wheezing is present, administer inhaled (3 ml of premixed 0.083% albuterol, or 3 ml of solution of 2.5 mg or 0.5 ml of 0.5% albuterol mixed with 2.5 ml of NS) prn respiratory distress.[3][4] 7. If child unable or unwilling to cooperate with inhalation, administer Epinephrine (1:1000), 0.01 mg/kg = 0.01 ml/kg SQ. Maximum single dose 0.3 mg or 0.3 ml. May repeat q 20 minutes prn respiratory distress/persistent wheezing.	6. Epinephrine (1:10,000), 0.01 mg/kg = 0.1 ml/kg IV or IO. Maximum single dose 0.1 mg = 1 ml. Repeat q 5 minutes prn respiratory distress or diminished perfusion. [5,6] 7. If wheezing is present, administer inhaled 0.5% albuterol (2.5 mg/3 ml normal saline) prn respiratory distress.[4] If wheezing severe, administer inhaled albuterol (2.5 mg/3ml normal saline) continuously. 8. For diminished perfusion, administer 20 ml/kg fluid boluses, IV or IO.	
PEDIATRIC ALLERGIC REACTIONS - ANAPHYLAXIS		

Pediatric Seizure

Field Treatment	Special Considerations
1. Field Primary Survey. 2. Gently support head of child to avoid head trauma. 3. Loosen tight-fitting clothing.	[1] Use pulse oximeter, if available. [2] Obtain blood sugar by fingerstick, if unable to establish venous access. [3] D_{25} is 1/2 strength $D_{50}W$. Mix 1 ml of $D_{50}W$ with 1 ml of NS. [4] Use rapid blood glucose level of < 40 mg % for neonates, before D_{10} administration. Mix 1 ml of $D_{50}W$ with 4 ml of NS to get D_{10}. [5] Be prepared to support ventilation and oxygenation through bag-valve mask or by endotracheal intubation and manual ventilation.
4. Cardiac monitor.[1] 5. Venous access prn - rapid blood glucose.[2] 6. If rapid blood glucose test shows glucose < 60 mg %: a) If IV established: $D_{50}W$, 1 ml/kg IV for > 2 yrs $D_{25}W$, 2 ml/kg IV for < 2 yrs.[3] $D_{10}W$, 3 ml/kg IV for neonates. [4] May repeat once b) If no IV access: glucagon, 1 mg IM 7. If seizure continues, administer diazepam, 0.5 mg/kg rectally. Maximum dose 10 mg. May repeat once in 15 minutes prn for persistent seizure or recurrent seizure.[5] 8. If seizure continues for 10 minutes after rectal diazepam, consider diazepam, 0.1- 0.2 mg/kg slow IVP or IO.[4]	
PEDIATRIC SEIZURE	

Pediatric Altered Level of Consciousness

Field Treatment	Special Considerations
1. Field Primary Survey.[1] 2. Administer oral glucose agents for conscious known diabetic with intact gag reflex.	[1] Consider etiology and appropriate protocols: ! Shock ! Toxic exposure ! Head Trauma (R/O intentional injury) ! Seizure [2] Use pulse oximetry, if available. [3] D_{25} is 1/2 strength $D_{50}W$. Mix 1 ml of $D_{50}W$ with 1 ml of NS. [4] Use rapid blood glucose level of < 40 mg% for neonates, before D_{10} administration. Mix 1 ml of $D_{50}W$ with 4 ml of NS to get D_{10}. [5] Avoid naloxone in newborns.
3. Advanced airway prn.[2] 4. Cardiac monitor. 5. Vascular access and rapid blood glucose test. 6. If blood glucose test < 60 mg%: a. If IV established: $D_{50}W$, 1 ml/kg for > 2 years of age. $D_{25}W$, 2 ml/kg for age < 2 year of age.[3] $D_{10}W$, 3 ml/kg IV for neonates. [4] May repeat once. b. If no IV access: glucagon, 1 mg IM. 7. If mental status and respiratory effort are depressed (and child is not a neonate), administer naloxone, 2 mg IV. May repeat q 5 minutes with strong suspicion of opiate overdose, or if partial response is noted. Naloxone may also be administered ET, IM, or IO.[4]	
PEDIATRIC ALTERED LEVEL OF CONSCIOUSNESS (ALOC)	

Pediatric Toxic Exposures

Field Treatment	Special Considerations
1. Assess scene.[1] 2. Field Primary Survey. 3. Bring substance containers to hospital, whenever possible.	[1] Consider hazardous material exposure and consultation with appropriate advisory agency, prior to decontamination or patient contact procedures. [2] If suspected opiate overdose in non-neonate, administer naloxone, 2 mg IV, IO or IM prior to advanced airway. [3] Use pulse oximetry, if available. [4] Consider activated charcoal, 1 g/kg PO. Maximum 50 g. Examples of other treatable exposures and antidotes are: ! Organophosphates, with high dose atropine. ! Tricyclic antidepressants, with HC_{03}. ! Opiates, with naloxone.
4. Advanced airway prn.[2][3] 5. Cardiac monitor. 6. Vascular access prn. 7. Base Hospital may provide specific information about individual toxic exposures and treatments.[4] 8. Assess for other potential toxic exposures.	
PEDIATRIC TOXIC EXPOSURES	

Pediatric Burns

Field Treatment		Special Considerations
1. Field Primary Survey.[1] 2. Stop burning process. Remove jewelry and clothing. 3. If chemical is dry, brush off, then flush with copious water. If liquid, flush with copious water.[3] 4. If eye involvement, flush continuously with normal saline during transport. 5. Apply clean, dry wound dressings and/or sheet to involved areas.[2] 6. Shock position prn.		[1] Apply 100% oxygen by non-rebreather mask for potential inhalation injury. [2] Do not apply cool dressings or allow environmental exposure, since hypothermia will result in a young child. Transport immediately to receiving hospital. [3] Contact with appropriate advisory agency may be necessary for hazardous materials, prior to decontamination or patient contact. [4] Use pulse oximeter, if available. [5] Morphine (0.1 mg/kg or 0.05 mg/kg < 6 months of age) IV maybe indicated, after Base Hospital physician order, if volume status and perfusion are adequate. [6] Prolonged resuscitation may be indicated.
7. Advanced airway prn. [4]		
THERMAL INJURY/CHEMICAL BURNS	**ELECTRICAL BURNS**	
8. Vascular access prn.[5]	8. Cardiac monitor. 9. Vascular access prn. 10. Treat dysrhythmia by appropriate protocol.[6]	
PEDIATRIC BURNS		

Pediatric Trauma

Field Treatment		Special Considerations
1. Field Primary Survey. 2. Spinal immobilization prn. [1] 3. Control external hemorrhage with direct pressure. Shock position prn. 4. If extremity amputated, place amputated part in dry gauze in sterile container and place container on ice, if available. 5. If head trauma, elevate head in midline 15-20 degrees, if no signs of shock are present. 6. If avulsed tooth, transport tooth in patient's mouth (if age and mental status are appropriate), or in milk or normal saline, or other appropriate medium. 7. Splints, dressings prn.		[1] Immobilize spine of patients with mechanism, signs, or symptoms suggesting spinal injury. [2] Use pulse oximeter, if available. [3] If head trauma and unresponsiveness, with signs of increased intracranial pressure, hyperventilate with endotracheal tube in place. Maintain neutral spinal position with appropriate immobilization. [4] See Shock protocol.
BLUNT TRAUMA	**PENETRATING TRAUMA**	
8. Advanced airway prn.[2][3] 9. Transport. 10. Cardiac monitor. 11. Vascular access prn. 12. See Hypovolemic Shock protocol, if signs of shock.[4]	8. Seal sucking chest wound with 3-sided taping and occlusive seal of petrolatum gauze prn. 9. If suspected tension pneumothorax, with severe respiratory distress, consider needle thoracostomy. 10. Vascular access prn. 11. See Hypovolemic Shock protocol, if signs of shock.[4]	
	PEDIATRIC TRAUMA	

APPENDIX

Weights in kilograms, age-adjusted vital signs,
and ET Tube sizes for children

AGE	MEAN WEIGHT IN KG.	MINIMUM SYSTOLIC BP	NORMAL HR	NORMAL RR	ET TUBE SIZE
Premature	< 2.5	40	120-170	40-60	2.5-3.0
Term	3.5	60	100-170	40-60	3.0-3.5
3 months	6	60	100-170	30-50	3.5
6 months	8	60	100-170	30-50	4.0
1 year	10	72	100-170	30-40	4.0
2 years	13	74	100-160	20-30	4.5
4 years	15	78	80-130	20	5.0
6 years	20	82	70-115	16	5.5
8 years	25	86	70-110	16	6.0
10 years	30	90	60-105	16	6.5
12 years	40	94	60-100	16	7.0

Systolic blood pressure = 70 + 2 x (age in years)

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